APPENDIX D
PHYSICAL TESTING LABORATORY REPORT
COOPER TESTING LABORATORY

1951-X Colony St.
Mt. View, CA 94043
TEL 650-968-9472
FAX 650-968-4228

Cooper Testing Labs, Inc.
Test Request Sheet

1360-D Industrial Ave.
Petaluma, CA 94952
TEL 707-765-2589
FAX 707-765-1227

Please check appropriate box for billing purposes: ***Mountain View Lab*** ■ **Petaluma Lab** □

(email: cooper@coopertestinglabs.com) **(home page: www.coopertestinglabs.com)**

CTL#		P.O. #:	JPL-365-0104	Your Client:	
Our Client:	Ground Zero Analysis	Date In:		Project Name:	Pure Etch Company
Results To:	John Lane	Due Date:		Project No.:	365
Billing Address:	*1714 Main Street*				
City:	Escalon				
State:	Ca	Zip:	95320-1927		

Boring	Depth ft	Test	Instructions
LPE MW6	5-6	7, 8, 30	
LPE MW6	25-25.5	7, 8, 30	
LPE MW9	5-6	7, 8, 9, 30	
LPE MW9	25-25.5	7, 8, 9, 30	
LPE MW11	5-5.5	7, 8, 9, 30	
LPE MW11	25-25.5	7, 8, 9, 30	

Corrosion Testing

Test	Price	Quantity	
Resistivity	$50		As Received
Resistivity	60		Saturated (ASTM)
Resistivity	100		Minimum (Caltrans)
pH	25		
Sulfate	45		
Sulfide	50		
Redox	40		
Chloride	35		
CT Package	185		Caltrans
Package A	149		
Package B	144		
Package C	176		
Package D	185		

Test	Test #	Price	Quantity
Moisture (MC)	1	$13	
MD, 2-2.5" diameter	2	18	
MD 3" diameter	3	24	
PI A/B	4	180/125	
Sieve (SA) + 3/4" ma	5	90/115	
Sieve + Hydrometer	6	150	
-#200Wash	7	60	6
Specific Gravity	8	70	6
% Organics	9	70	4
Total Porosity	10	90	
UC	11	60	
Direct Shear - UU *	12	65/point	
DS-CU	13	80/point	
DS-CD	14	170/point	
DS-Residual-Quick *	15	125/point	
DS-CD-Residual *	16	245/point	
TX-UU	17	100	
TX-ICU	18	185/point	
TX-ICU- Staged	19	360 3point	
TX-ICU-PP	20	420/point	
TX-ICU-PP- Staged	21	840 3point	
Torsional pk. & Resid	22	400/point	
Torsional resid. Staged	23	240/point	
Torsional Peak	24	215/point	
Incremental - Consol	25	295	
CRS - Consol	26	360	
Sample Pick-up	27	50	
Durability Index	28	200	
Collapse	29	130	
Permeability 2-3" dia.	30	250	6
PERM on drain rock	31	360	
Logging per hour	32	100	
Modified Proctor 4"	33	205	
Modified Proctor 6"	34	250	
Remolding	35	50	
R-value/batch	36	185/215	
Sand Equivalent (SE)	37	60	
SS+Expansion-Pressure	38	210/225	
Shrink Swell (SS)	39	120	
Class 2 Spec	40	580	
Senior Technician	41	100	
Junior Technician	42	70	
	43		

Additional Instructions:

Need density, soil moisture, effective permeability, porosity and grain size distribution for all samples.

In addition, need organic carbon content from borings MW9 and MW11.

Please call if the tests marked above are not sufficient to acquire this informaiton.

Results to John Lane, Ground Zero Analysis, 1714 Main Street, Escalon, CA 95320, 2098389888, 2098389883 fax

COOPER

Organic Content Test
ASTM D 2974-00 (Method C - 440 °C)

CTL JOB NO.:	322-006	PROJECT:	Pure Etch Company	DATE: 1/30/2004
CLIENT :	Ground Zero Analysis	PROJECT NO.:	365	BY: MJ

Boring :	LPE MW9	LPE MW9	LPE MW11	LPE MW11				
Sample :								
Depth (ft.):	5	25	5	25				
Visual Description:	Brown CLAY	Yellowish Brown SAND	Brown CLAY	Yellowish Brown SAND				
Dish No.	OR15	OR15	OR9	OR14				
Dish wt., gm	75.42	75.42	79.46	82.73				
Soil, Org, Dish & H_2O, gm	123.48	137.20	131.94	151.76				
Oven Dry wt (105°C), gm	112.40	135.35	119.85	146.86				
Furnace Dry wt. (440°C), gm	111.53	135.15	118.82	146.50				
Moisture Content, % of Oven Dry Mass	30.0	3.1	29.9	7.6				
Organic Content, %	2.4	0.3	2.6	0.6				

Remarks:

COOPER TESTING LABORATORY

Specific Gravity by Pycnometer

ASTM D 854

Job#:	322-006	**Date:**	01/30/04
Client:	Ground Zero Analysis	**Run By:**	MD
Project:	Pure Etch Company - 365	**Checked**	DC

Boring:	LPE MW6	LPE MW6	LPE MW9	LPE MW9	LPE MW11	LPE M11		
Sample:								
Depth, ft.:	5	25	5	25	5	25		
Soil Description (visual)	Brown CLAY with pockets of Clayey Sand	Yellowish Brown SAND	Brown CLAY	Yellowish Brown SAND	Brown CLAY	Yellowish Brown SAND		
Hydroscopic MC	0.01	0.00	0.02	0.00	0.02	0.06		
Wet Weight, gm	30.02	33.12	20.19	31.88	22.32	68.35		
Dry Wt., gm	29.81	33.05	20	31.82	22.11	64.26		
Dish, gm	11.58	11.55	11.43	11.61	11.43	0		
Wb, gm	704.3	720.6	695.9	728.8	691	712.1		
T °C	18	18.3	18	18	18.3	18		
Wa, gm	663.1	672.1	671.78	681.24	663.06	672.13		
Wo, gm	65.5	78.1	38.67	76.47	45.19	68.35		
Wo Corrected	64.75	77.85	37.83	76.24	44.32	64.26		
K	1.0004	1.0004	1.0004	1.0004	1.0004	1.0004		
Gs = $\frac{K\ Wo}{Wo+Wa-Wb}$ Specific Gravity (20°c)	**2.75**	**2.65**	**2.76**	**2.66**	**2.71**	**2.65**		

Wb = Weight of Pycnometer, Soil & Water
Wa= Weight of Pycnometer & Water
T = Temperature
K= Temperature Correction Factor
Wo = Weight of Air-Dried Soil
MC=Moisture Content

#200 Sieve Wash Analysis
ASTM D 1140

Job No.:	322-006	**Project No.:**	365	**Run By:**	MD
Client:	Ground Zero Analysis	**Date:**	1/30/2004	**Checked By:**	DC
Project:	Pure Etch Company .				

Boring:	LPE MW6	LPE MW6	LPE MW9	LPE MW9	LPE MW11	LPE MW11		
Sample:								
Depth, ft.:	5	25	5	25	5	25		
Soil Type:	Brown CLAY with pockets of Clayey Sand	Yellowish Brown SAND	Brown CLAY	Yellowish Brown SAND	Brown CLAY	Yellowish Brown SAND		
Wt of Dish & Dry Soil, gm	215.2	263.9	236.3	408.5	201.0	472.2		
Weight of Dish, gm	85.2	84.5	80.2	80.8	83.5	80.3		
Weight of Dry Soil, gm	130.0	179.4	156.1	327.7	117.5	391.9		
Wt. Ret. on #4 Sieve, gm	3.2	0.6	1.2	0.9	0.0	11.2		
Wt. Ret. on #200 Sieve, gm	21.6	176.9	32.2	317.9	1.2	382.6		
% Gravel	**2.5**	**0.3**	**0.8**	**0.3**	**0.0**	**2.9**		
% Sand	**14.2**	**98.3**	**19.9**	**96.7**	**1.0**	**94.8**		
% Silt & Clay	**83.4**	**1.4**	**79.4**	**3.0**	**99.0**	**2.4**		

Remarks: As an added benefit to our clients, the gravel fraction may be included in this report. Whether or not it is included is dependent upon both the technician's time available and if there is a significant enough amount of gravel. The gravel is always included in the percent retained on the #200 sieve but may not be weighed separately to determine the

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

Job No:	322-006	**Boring:**	LPE MW6	**Date:**	02/03/04
Client:	Ground Zero Analysis	**Sample:**		**By:**	MD/PJ
Project:	Pure Etch Company - 365	**Depth'**	5'	**Remolded:**	

Visual Classification: Brown CLAY w/ pockets of Clayey Sand

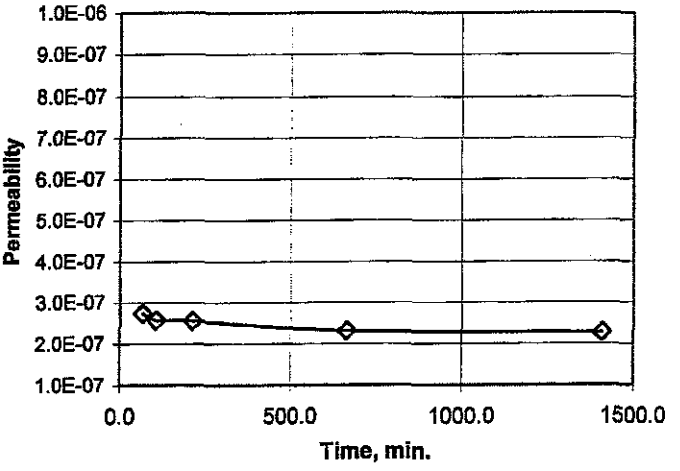
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma 3
63.5	59.5	57.5	5

B: = >0.95 ("B" is an indication of saturation)

Max Hydraulic Gradient: = 33

Date	Minutes	Head, (in)	K,cm/sec
1/27/2004	0.00	168.67	Start of Test
1/27/2004	66.00	167.26	2.7E-07
1/27/2004	105.00	166.66	2.6E-07
1/27/2004	212.00	164.66	2.6E-07
1/27/2004	666.00	157.26	2.3E-07
1/28/2004	1409.00	147.26	2.3E-07



Average Permeability: 2.E-07 cm/sec

Sample Data:	Initial	Final
Height, in	2.00	2.00
Diameter, in	1.88	1.92
Area, in2	2.78	2.90
Volume in3	5.55	5.79
Total Volume, cc	91.0	94.9
Volume Solids, cc	62.4	62.4
Volume Voids, cc	28.5	32.5
Void Ratio	0.5	0.5
Porosity, %	31.4	34.2
Saturation, %	87.6	95.8
Specific Gravity	2.75	2.75
Wet Weight, gm	196.7	202.8
Dry Weight, gm	171.7	171.7
Tare, gm	0.00	0.00
Moisture, %	14.6	18.1
Dry Density, pcf	117.8	112.9

Remarks:

COOPER

Constant Head Permeability Test
ASTM D 2434

CTL Job No: 322-006 | Boring: LPE MW6 | Date: 2/4/2004
Client: Ground Zero Analysis | Sample: | By: MD/PJ
Project Name: Pure Etch Company | Depth, ft: 25
Project No.: 365
Soil Description: Yellowish Brown SAND w/ Silt, slightly cemented
Remolding Data:

		Constant Head Calculation, K=QL/thA				
Test #	Elapsed Time t, (sec)	Volume Q, (cc)	Head Loss h (cm)	Water Temp (°C)	Hydraulic Gradient	Coef. Of Permeability K, (cm/sec)
1	60	6	15.24	20.0	3.31	1.5E-03
2	240	19	15.24	20.0	3.31	1.3E-03
3	300	23	15.24	20.0	3.31	1.3E-03
4	420	32	15.24	20.0	3.31	1.2E-03
5	840	59	15.24	20.0	3.31	1.1E-03
6	180	16	15.24	20.0	3.31	1.4E-03
			Average Permeability (cm/sec):			1.E-03

Sample Data:		Initial	Final
Height, (L)	in.:	2.00	1.81
Diameter,	in.:	1.93	1.93
Area, (A)	in^2:	2.93	2.93
Volume,	in^3:	5.85	5.30
Total Volume.	cc:	96	87
Vol. of Solids,	cc:	55	55
Vol. of Voids,	cc:	41	32
Void Ratio	e:	0.74	0.57
Porosity,	%:	42.5	36.5
Saturation,	%:	22.8	99.9
Sp. Gravity:		2.65	2.65
Wet Weight,	gm:	155.4	177.7
Dry Weight	gm:	146.1	146.1
Moisture,	%:	6.4	21.6
Density,	pcf:	95.1	105.1

Remarks:

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

Job No:	322-006	**Boring:**	LPE MW9	**Date:**	02/03/04
Client:	Ground Zero Analysis	**Sample:**		**By:**	MD/PJ
Project:	Pure Etch Company - 365	**Depth'**	5'	**Remolded:**	

Visual Classification: Brown CLAY

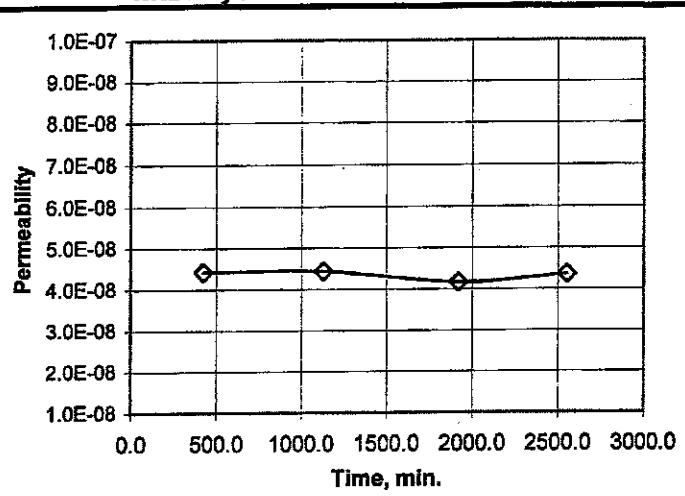
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma 3
73.5	69.5	67.5	5

Date	Minutes	Head, (in)	K,cm/sec
1/26/2004	0.00	79.38	Start of Test
1/26/2004	424.00	78.53	4.4E-08
1/27/2004	1129.00	77.18	4.4E-08
1/27/2004	1920.00	75.73	4.2E-08
1/28/2004	2551.00	74.58	4.4E-08

B: = >0.95 ("B" is an indication of saturation)

Max Hydraulic Gradient: = 40



Average Permeability: 4.E-08 cm/sec

Sample Data:	Initial	Final
Height, in	2.00	2.02
Diameter, in	1.88	1.89
Area, in2	2.78	2.81
Volume in3	5.55	5.67
Total Volume, cc	91.0	92.9
Volume Solids, cc	47.6	47.6
Volume Voids, cc	43.4	45.3
Void Ratio	0.9	1.0
Porosity, %	47.7	48.7
Saturation, %	89.7	99.9
Specific Gravity	2.76	2.76
Wet Weight, gm	170.3	176.6
Dry Weight, gm	131.4	131.4
Tare, gm	0.00	0.00
Moisture, %	29.6	34.4
Dry Density, pcf	90.1	88.3

Remarks:

COOPER

Constant Head Permeability Test
ASTM D 2434

CTL Job No: 322-006 Boring: LPE MW9 Date: 2/4/2004

Client: Ground Zero Analysis Sample: By: MD/PJ

Project Name: Pure Etch Company Depth, ft: 25

Project No.: 365

Soil Description: Yellowish Brown SAND w/ Silt

Remolding Data:

		Constant Head Calculation, K=QL/thA				
Test #	Elapsed Time t, (sec)	Volume Q, (cc)	Head Loss h (cm)	Water Temp (°C)	Hydraulic Gradient	Coef. Of Permeability K, (cm/sec)
1	60	23	17.78	20.0	4.00	5.1E-03
2	90	35	17.78	20.0	4.00	5.1E-03
3	120	47	17.78	20.0	4.00	5.2E-03
4	150	58	17.78	20.0	4.00	5.1E-03
5	60	20	17.78	20.0	4.00	4.5E-03
6	120	40	17.78	20.0	4.00	4.4E-03
			Average Permeability (cm/sec):			5.E-03

Sample Data:		Initial	Final
Height, (L)	in.:	2.00	1.75
Diameter,	in.:	1.93	1.93
Area, (A)	in^2:	2.93	2.93
Volume,	in^3:	5.85	5.12
Total Volume.	cc:	96	84
Vol. of Solids,	cc:	52	52
Vol. of Voids,	cc:	44	32
Void Ratio	e:	0.83	0.60
Porosity,	%:	45.4	37.6
Saturation,	%:	16.1	100.0
Sp. Gravity:		2.66	2.66
Wet Weight,	gm:	146.3	170.8
Dry Weight	gm:	139.3	139.3
Moisture,	%:	5.0	22.6
Density,	pcf:	90.7	103.6

Remarks:

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

Job No:	322-006	**Boring:**	LPE MW11	**Date:**	02/03/04
Client:	Ground Zero Analysis	**Sample:**		**By:**	MD/PJ
Project:	Pure Etch Company - 365	**Depth'**	5'	**Remolded:**	

Visual Classification: Brown CLAY

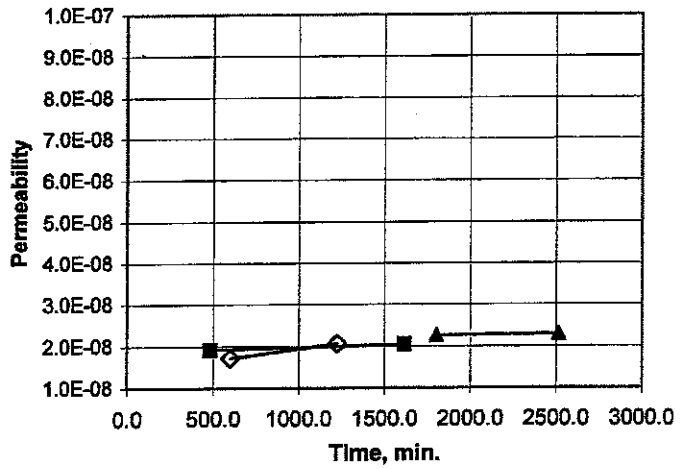
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma 3
73.5	69.5	67.5	5

Date	Minutes	Head, (in)	K,cm/sec
1/27/2004	0.00	168.67	Start of Test
1/27/2004	600.00	167.86	1.7E-08
1/28/2004	1223.00	166.86	2.1E-08
1/30/2004	483.00	167.46	1.9E-08
1/31/2004	1615.00	165.86	2.0E-08
2/2/2004	1801.00	165.56	2.3E-08
2/3/2004	2513.00	164.56	2.3E-08

B: = >0.95 ("B" is an indication of saturation)

Max Hydraulic Gradient: = 33



Average Permeability: 2.E-08 cm/sec

Sample Data:	Initial	Final
Height, in	2.01	2.06
Diameter, in	1.91	1.96
Area, in2	2.88	3.00
Volume in3	5.78	6.18
Total Volume, cc	94.7	101.2
Volume Solids, cc	52.1	52.1
Volume Voids, cc	42.5	49.1
Void Ratio	0.8	0.9
Porosity, %	44.9	48.5
Saturation, %	95.7	99.9
Specific Gravity	2.71	2.71
Wet Weight, gm	182.0	190.3
Dry Weight, gm	141.3	141.3
Tare, gm	0.00	0.00
Moisture, %	28.8	34.7
Dry Density, pcf	93.1	87.1

Remarks:

COOPER

Constant Head Permeability Test
ASTM D 2434

CTL Job No: 322-006 | Boring: LPE MW11 | Date: 2/4/2004
Client: Ground Zero Analysis | Sample: | By: MD/PJ
Project Name: Pure Etch Company | Depth, ft: 25
Project No.: 365
Soil Description: Yellowish Brown SAND w/ Gravel (loose)
Remolding Data:

		Constant Head Calculation, K=QL/thA				
Test #	Elapsed Time t, (sec)	Volume Q, (cc)	Head Loss h (cm)	Water Temp (°C)	Hydraulic Gradient	Coef. Of Permeability K, (cm/sec)
1	30	11	15.24	19.0	3.55	5.8E-03
2	60	21	15.24	19.0	3.55	5.4E-03
3	90	31	15.24	19.0	3.55	5.3E-03
4	120	42	15.24	19.0	3.55	5.4E-03
					Average Permeability (cm/sec):	5.E-03

Sample Data:		Initial	Final
Height, (L)	in.:	2.00	1.69
Diameter,	in.:	1.93	1.93
Area, (A)	in^2:	2.93	2.93
Volume,	in^3:	5.85	4.94
Total Volume.	cc:	96	81
Vol. of Solids,	cc:	53	53
Vol. of Voids,	cc:	43	28
Void Ratio	e:	0.81	0.53
Porosity,	%:	44.6	34.5
Saturation,	%:	14.3	100.0
Sp. Gravity:		2.65	2.65
Wet Weight,	gm:	146.8	168.6
Dry Weight	gm:	140.7	140.7
Moisture,	%:	4.3	19.9
Density,	pcf:	91.6	108.4

Remarks: Gravel fragments in center of sample impeded flow.